

WOLF CREEK

NUCLEAR OPERATING CORPORATION

Donna Jacobs
Vice President Operations and Plant Manager

July 27, 2004
WO 04-0039

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Subject: Docket No. 50-482: 60-Day Response to NRC Bulletin 2004-01,
"Inspection of Alloy 82/182/600 Materials Used in the Fabrication of
Pressurizer Penetrations and Steam Space Piping Connections at
Pressurized-Water Reactors"


Gentlemen:

Attachment I to this letter provides the Wolf Creek Nuclear Operating Corporation (WCNOC) response to NRC Bulletin 2004-01, "Inspection of Alloy 82/182/600 Materials used in the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors," dated May 28, 2004. NRC Bulletin 2004-01 requires information related to the materials from which the pressurizer penetrations and steam space piping connections at their facilities were fabricated, and information related to the inspections that have been and those that will be performed to ensure that degradation of Alloy 82/182/600 materials used in the fabrication of pressurizer penetrations and steam space piping connections will be identified, adequately characterized, and repaired.

Attachment II lists WCNOC's commitments contained in this correspondence.

If you have questions concerning this matter, please contact me at (620) 364-4246 or Mr. Kevin Moles at (620) 364-4126.

Sincerely,



Donna Jacobs

DJ/rig

Attachments: I - Response to NRC Bulletin 2004-01
II - List of Commitments

cc: J. N. Donohew (NRC)
D. N. Graves (NRC)
B. S. Mallett (NRC)
Senior Resident Inspector (NRC)

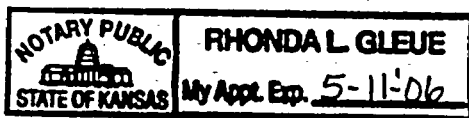
AIR

STATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Donna Jacobs, of lawful age, being first duly sworn upon oath says that she is Vice President Operations and Plant Manager of Wolf Creek Nuclear Operating Corporation; that she has read the foregoing document and knows the contents thereof; that she has executed the same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of her knowledge, information and belief.

By *Donna Jacobs*
Donna Jacobs
Vice President Operations and Plant Manager

SUBSCRIBED and sworn to before me this 27 day of July, 2004.



Rhonda L. Gleue
Notary Public

Expiration Date May 11, 2006

Attachment I
**60-Day Response to NRC Bulletin 2004-01, "Inspection of Alloy 82/182/600 Materials
Used in the Fabrication of Pressurizer Penetrations and Steam
Space Piping Connections at Pressurized-Water Reactors"**

Below is the Wolf Creek Nuclear Operating Corporation (WCNOC) response to the U.S. Nuclear Regulatory Commission (NRC) letter dated May 28, 2004 and entitled NRC Bulletin 2004-01, "Inspection of Alloy 82/182/600 Materials used in the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors." This response addresses the Requested Information items (1)(a), (1)(b), (1)(c), (1)(d) and (2).

NRC Bulletin 2004-01 also required information for lines attached directly to the pressurizer, with the exception of the surge line, for any locations, including those remote from the pressurizer shell, which contain Alloy 82/182/600 materials which are exposed to conditions similar to those of the pressurizer environment. This requirement is not addressed because Wolf Creek Generating Station (WCGS) does not contain any lines meeting these criteria.

NRC Requested Information:

- (1)(a) A description of the pressurizer penetrations and steam space piping connections at your plant. At a minimum, this description should include materials of construction (e.g., stainless steel piping and/or weld metal, Alloy 600 piping/sleeves, Alloy 82/182 weld metal or buttering, etc.), joint design (e.g., partial penetration welds, full penetration welds, bolted connections, etc.), and, in the case of welded joints, whether or not the weld was stress-relieved prior to being put into service. Additional information relevant with respect to determining the susceptibility of your plant's pressurizer penetrations and steam space piping connections to PWSCC should also be included.

WCNOC Response:

The pressurizer heaters consist of 78 heater sleeve penetrations. They are arranged in three (3) rows with 20, 26, and 32 penetrations per row. The sleeve material is 316 stainless steel (SA-182, GRF316). The sleeve is cold rolled in the penetration and welded to the cladding with 0.19 inch J-groove weld using 308L stainless steel material. The thickness of the stainless steel cladding is increased in the area of the penetrations to 0.38 inch minimum compared to 0.063 inch minimum for the remainder of the pressurizer.

The pressurizer contains nine (9) instrument connections. The pressurizer instrument connections are made from SA-213 TP 316 stainless steel. The sleeve is cold rolled in the penetration and welded to the cladding with 0.12 inch J-groove weld using 308L stainless steel material. The thickness of the stainless steel cladding is increased in the area of the penetrations to a minimum of 0.19 inch. Five (5) of the penetrations are in the liquid space and four (4) of the penetrations are in the steam space.

The pressurizer contains one (1) spray nozzle connection. The pressurizer spray nozzle is a carbon steel forging with an inconel weld to a safe end (316L stainless steel) for the transition to the stainless steel spray line supply header. The spray nozzle is in the pressurizer steam space. The transition weld between the nozzle forging to the safe end is a full penetration weld with alloy 82/182 buttering and weld metal. The inconel buttering was stress relieved prior to welding of the safe end. The subsequent weld to the safe end was not stress relieved.

The pressurizer contains one (1) relief nozzle and three (3) safety nozzles. The relief and safety nozzles are carbon steel forgings with inconel welds to safe ends (316L stainless steel) for the transition to the stainless steel piping lines. The relief and safety nozzles are in the pressurizer steam space. The transition welds between the nozzle forgings to the safe ends are full penetration welds with alloy 82/182 buttering and weld metal. The inconel buttering was stress relieved prior to welding of the safe ends. The subsequent weld to the safe end was not stress relieved.

NRC Requested Information:

- (1)(b) A description of the inspection program for Alloy 82/182/600 pressurizer penetrations and steam space piping connections that has been implemented at your plant. The description should include when the inspections were performed; the areas, penetrations and steam space piping connections inspected; the extent (percentage) of coverage achieved for each location which was inspected; the inspection methods used; the process used to resolve any inspection findings; the quality of the documentation of the inspections (e.g., written report, video record, photographs); and, the basis for concluding that your plant satisfies applicable regulatory requirements related to the integrity of pressurizer penetrations and steam space piping connections. If leaking pressurizer penetrations or steam space piping connections were found, indicate what followup NDE was performed to characterize flaws in the leaking penetrations.

WCNOC Response:

Inspections:

As described in (1)(a) above, the WCGS pressurizer has Alloy 82/182/600 components only in the piping connections. The penetrations and associated J-groove welds are stainless steel.

Table 1 of this attachment identifies the steam space piping connections examined, the examination methods used; and when the examinations were performed. All coverage is 100% except as noted for the spray nozzle. No rejectable indications were found during the inspections. All inspections were documented by written record.

In addition to the NDE listed in Table 1, all locations received a Boric Acid Corrosion Control Program walkdown at the beginning of each refueling outage and an ASME Section XI pressure test at Normal Operating Pressure (NOP) near the completion of each refueling outage.

Table 1

Weld ID	Description	Interval 1	Interval 2
TBB03-02-W	Spray nozzle to safe-end weld	PT, RF6, 3/1993 UT, RF6, 3/1993 (Note 1)	No ISI inspection (Note 2)
TBB03-03-A-W	Safety nozzle to safe-end weld	PT, RF1, 10/1986 UT, RF1, 11/1986	PT, RF9, 10/1997 UT, RF9, 10/1997
TBB03-03-B-W	Safety nozzle to safe-end weld	PT, RF1, 10/1986 UT, RF1, 11/1986	PT, RF9, 10/1997 UT, RF9, 10/1997
TBB03-03-C-W	Safety nozzle to safe-end weld	PT, RF4, 3/1990 UT, RF4, 3/1990	PT, RF11, 10/2000 UT, RF11, 10/2000
TBB03-04-W	Relief nozzle to safe-end weld	PT, RF4, 3/1990 UT, RF4, 3/1990	PT, RF11, 10/2000 UT, RF11, 10/2000
<p>Note 1: Only 46% coverage achieved in the axial direction. Relief was requested for reduced coverage and approved by the NRC (Reference 1).</p> <p>Note 2: No ISI inspection required due to Risk Informed ISI program implementation. In October, 2003, during refueling outage RF13, the spray nozzle to vessel weld was examined. In the process of removing the insulation to examine this weld, insulation was also removed from the spray nozzle to safe-end weld, TBB03-02-W. No evidence of boric acid was noted at this location. Photographs were taken of this area at this time.</p>			

WCNOC implemented a Risk Informed Inservice Inspection (RI-ISI) program in Period 2 of Interval 2, which encompasses the piping connection welds to the pressurizer. The WCGS RI-ISI program utilizes the methodology in EPRI TR-112657 Rev. B-A (Reference 2). Welds TBB03-03-A-W and TBB03-04-W were selected for examination.

Compliance with Regulatory Requirements:

As described in the applicable regulatory requirements section of NRC Bulletin 2004-01, several provisions of the NRC regulations and plant operating licenses pertain to reactor coolant pressure boundary (RCPB) integrity and the issues addressed in the Bulletin.

As part of the original design and licensing of WCGS, WCNOC demonstrated the design of the RCPB meets these requirements. WCNOC complied with these criteria in part by: 1) selecting corrosion resistant austenitic and ferrous materials with extremely high fracture toughness for RCPB materials; and 2) following NRC approved codes and standards for fabrication, erection, and testing of the pressure boundary parts. WCNOC has implemented the required ASME Section XI examinations in accordance with the WCGS ISI Plan. The requirements established for design, fracture toughness, and inspectability in 10 CFR 50, Appendix A, GDC 14, 31, and 32, respectively, were satisfied during the initial design and licensing, and continue to be satisfied during operation, even though instances of stress corrosion cracking have been identified in other pressurizers.

Plant Technical Specifications:

The limits for RCPB leakage are provided in Technical Specification 3.4.13 (i.e., 1 gallon per minute for unidentified leakage; 10 gpm for identified leakage; and no leakage from a non-isolable fault in the RCPB). Routine surveillance testing is performed to ensure these requirements are met. Based on the few instances of flaws or leakage in industry experience, leaks from pressurizer Alloy 82/182 welds have been well below the sensitivity of on-line leakage detection systems. If measurable leakage is detected by the on-line leak

detection systems, the leak will be evaluated per the TS, and the plant will be shut down if required. Upon detection and identification of a leak, corrective actions will be taken to restore RCPB integrity. WCNOG continues to meet the requirements of this Technical Specification.

Inspection Requirements (10 CFR 50.55a and ASME Section XI):

The Bulletin describes the requirements for inspection in accordance with the ASME Code, detection of leakage from insulated components, and the acceptance standards if through wall leakage is detected. WCNOG has complied with the inspection requirements for the Alloy 82/182 welds as part of the WCGS ISI Plan. In addition, the insulated pressurizer and piping areas are also inspected through the WCGS Boric Acid Corrosion Control program walkdowns each outage.

Quality Assurance Requirements (10 CFR.50, Appendix B):

The Bulletin states that special processes, including nondestructive testing, shall be controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criterion, and other special requirements, as required by 10 CFR 50 Appendix B, Criterion V (Instructions, Procedures, and Drawings) and, Criterion IX (Control of Special Processes). WCNOG programs comply with these requirements.

As described above, WCNOG has performed routine inspections of these welds as required by the WCGS ISI Plan. These inspections have been performed and documented in accordance with ASME Section XI as described in WCNOG ISI program procedures.

Criterion XVI of 10 CFR 50 Appendix B states that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. For significant conditions adverse to quality, the measures taken shall include root cause determination and corrective action to preclude repetition of the adverse conditions. WCNOG programs comply with these requirements.

NRC Requested Information:

- (1)(c) A description of the Alloy 82/182/600 pressurizer penetration and steam space piping connection inspection program that will be implemented at your plant during the next and subsequent refueling outages. The description should include the areas, penetrations and steam space piping connections to be inspected; the extent (percentage) of coverage to be achieved for each location; inspection methods to be used; qualification standards for the inspection methods and personnel; the process used to resolve any inspection indications; the inspection documentation to be generated; and the basis for concluding that your plant will satisfy applicable regulatory requirements related to the structural and leakage integrity of pressurizer penetrations and steam space piping connections. If leaking pressurizer penetrations or steam space piping connections are found, indicate what followup NDE will be performed to characterize flaws in the leaking penetrations. Provide your plans for expansion of the scope of NDE to be performed if circumferential flaws are found in any portion of the leaking pressurizer penetrations or steam space piping connections.

WCNOC Response:

WCNOC will perform a bare metal visual examination of the Alloy 82/182/600 steam space piping connections on the pressurizer every refueling outage, until mitigative actions are taken or an industry recommended inspection program is issued.

As a minimum, in ISI program interval 3, the welds selected in the RI-ISI program will receive their scheduled volumetric examinations. Volumetric (UT) examinations will be qualified in accordance with Appendix VIII of ASME Section XI as modified by 10 CFR 50.55a. This includes qualification of procedures, equipment, and personnel.

WCNOC will achieve the maximum possible coverage for each location. Indications will be resolved in accordance with IWB-3000. For volumetric examinations in which essentially 100% of the ASME Code required coverage (i.e. > 90%) is not achieved, regulatory relief will be requested in accordance with 10 CFR 50.55a.

All of the subject locations will continue to receive the visual examinations required by the WCGS Boric Acid Corrosion Control program near the beginning of each refueling outage and the VT-2 examination of the ASME Section XI pressure testing program at the end of each refueling outage.

Documentation will be commensurate with the requirements of the inspection. Visual examinations will have written records as a minimum and photographs as appropriate. Manual ultrasonic exams will have written reports.

The regulatory requirements of 10 CFR 50.55a for the second ISI interval have been met. WCNOC will continue to meet the regulatory requirements of 10 CFR 50.55a in developing the third ISI interval program plan.

For a flaw with a through wall leak, sufficient NDE to facilitate the appropriate repair will be performed. This would generally be a volumetric examination(s) sufficient to determine the length and direction of the flaw. As a minimum, the requirements of the ASME Code will be met. Expansion of scope would be, as a minimum, in accordance with ASME Section XI.

NRC Requested Information:

(1)(d) In light of the information discussed in this bulletin and your understanding of the relevance of recent industry operating experience to your facility, explain why the inspection program identified in your response to item (1)(c) above is adequate for the purpose of maintaining the integrity of your facility's RCPB and for meeting all applicable regulatory requirements which pertain to your facility.

WCNOC Response:

Industry experience shows flaws in Alloy 82/182 welds have been detected through visual examination or routine inspections required by the ASME Section XI Code. As discussed in NRC Information Notice (IN) 2004-11 (Reference 3), flaws in pressurizer welds were determined to be axial. These flaws would not be expected to propagate into the carbon steel vessel or stainless steel piping components. The flaws reported in IN 2004-11 and industry experience

such as the V.C. Summer hot leg weld crack have not been near critical flaw size, and have retained significant strength and weld integrity.

The WCGS pressurizer does not contain Alloy 600 heater sleeves and welds, and leakage has not been reported through stainless steel heater sleeves.

As stated above, WCNOG will perform a bare metal visual (BMV) inspection of each identified weld location in the pressurizer with Alloy 82/182. The list of those locations is provided in Table 1. WCNOG will remove sufficient insulation to allow a BMV inspection of each of the welds containing Alloy 82/182 weld material. These inspections provide adequate assurance that any leakage will be detected at an early stage and can be corrected to ensure continued compliance with GDC 14 and 31 and retain an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

NRC Requested Information:

- (2) Within 60 days of plant restart following the next inspection of the Alloy 82/182/600 pressurizer penetrations and steam space piping connections, the subject PWR licensees should either:
- (a) submit to the NRC a statement indicating that the inspections described in the licensee's response to item (1)(c) of this bulletin were completed and a description of the as-found condition of the pressurizer shell, any findings of relevant indications of through-wall leakage, followup NDE performed to characterize flaws in leaking penetrations or steam space piping connections, a summary of all relevant indications found by NDE, a summary of the disposition of any findings of boric acid, and any corrective actions taken and/or repairs made as a result of the indications found,
 - or
 - (b) if the licensee was unable to complete the inspections described in response to item (1)(c) of this bulletin, submit to the NRC a summary of the inspections performed, the extent of the inspections, the methods used, a description of the as-found condition of the pressurizer shell, any findings of relevant indications of through-wall leakage, followup NDE performed to characterize flaws in leaking penetrations or steam space piping connections, a summary of all relevant indications found by NDE, a summary of the disposition of any findings of boric acid, and any corrective actions taken and/or repairs made as a result of the indications found. In addition, supplement the answer which you provided to item (1)(d) above to explain why the inspections that you completed were adequate for the purpose of maintaining the integrity of your facility's RCPB and for meeting all applicable regulatory requirements which pertain to your facility.

WCNOG Response:

Wolf Creek will provide the requested information within 60 days of plant restart following the next inspection of alloy 82/182/600 pressurizer penetrations or steam space piping connections.

References

1. Letter dated December 13, 2001, from USNRC to Otto L. Maynard, WCNOG, "Approval of Relief Request for Application of Risk-Informed Inservice Inspection Program for American Society of Mechanical Engineers Boiler and Pressure Vessel code Class 1 and 2 Piping for Wolf Creek Generating Station (WCGS)"
2. EPRI TR-112657 Rev. B-A, Revised Risk Informed Inservice Inspection Evaluation Procedure, Electric Power Research Institute, December, 1999
3. NRC Information Notice 2004-11, Cracking in Pressurizer Safety and Relief Nozzles and Surge Line Nozzles, May 6, 2004

**Attachment II
LIST OF COMMITMENTS**

The following table identifies those actions committed to by WCNOG in this document. Any other statements in this submittal are provided for information purposes and are not considered to be commitments. Please direct questions regarding these commitments to Mr. Kevin Moles at (620) 364-4126.

COMMITMENT	Due Date/Event
WCNOG will perform a bare metal visual examination of the Alloy 82/182/600 steam space piping connections on the pressurizer every refueling outage, until mitigative actions are taken or an industry recommended inspection program is issued.	Prior to plant restart following every refueling outage.
WCNOG will provide the information requested in NRC Bulletin 2004-01, Item 2 for the next inspection of alloy 82/182/600 pressurizer penetrations and steam space connections.	Within 60 days of plant restart following the next inspection of alloy 82/182/600 pressurizer penetrations and steam space connections.